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NOTE

# NOTES ON THE LENTIBULARIACEAE IN BOLIVIA: A NEW GENUS RECORD (*GENLISEA*) FOR THE COUNTRY, WITH TWO ADDITIONAL SPECIES RECORDS IN THE GENUS *UTRICULARIA*

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As part of our investigations in the wetlands of Parque Nacional Noel Kempff Mercado in eastern Bolivia, we have encountered two species of Lentibulariaceae that were previously not known for the country's flora: *Utricularia nana* A. St.-Hil. & Girard and *Genlisea guianensis* N. E. Brown. The latter constitutes the first record of this genus in Bolivia. Furthermore, while studying specimens at the Missouri Botanical Garden (MO), we encountered an unidentified specimen of *Utricularia* that had been collected from a large inselberg (granitic outcropping) just outside of the western border of Parque Noel Kempff. We were able to determine this specimen as *U. oliveriana* Steyermark, a third member of the Lentibulariaceae that had not previously been known for Bolivia.

The presence of *Genlisea guianensis* and *Utricularia nana* in eastern Bolivia represents only a small extension of their previously known distribution, as both are known to occur in the nearby state of Mato Grosso, Brazil (Taylor 1989). On the other hand, the population of *U. oliveriana* at Cerro Pelão represents an impressive disjunction from other known populations.

Parque Nacional Noel Kempff Mercado (Figure 1) is situated in the northeastern corner of the Department of Santa Cruz, in the Province of Velasco. As currently delineated, the park encompasses an area of approximately 15,300 $km^2$ (Killeen and Schulenberg 1999). *Genlisea guianensis* and *Utricularia nana* were encountered growing in seeps in a small clearwater stream on top of the Serranía de Huanchaca, a massive, steep-sided plateau situated along the eastern border of the park. The stream was fairly narrow (1–2 m), widening in a few areas to form small, still pools, with numerous wet seepy habitats present along the edges.

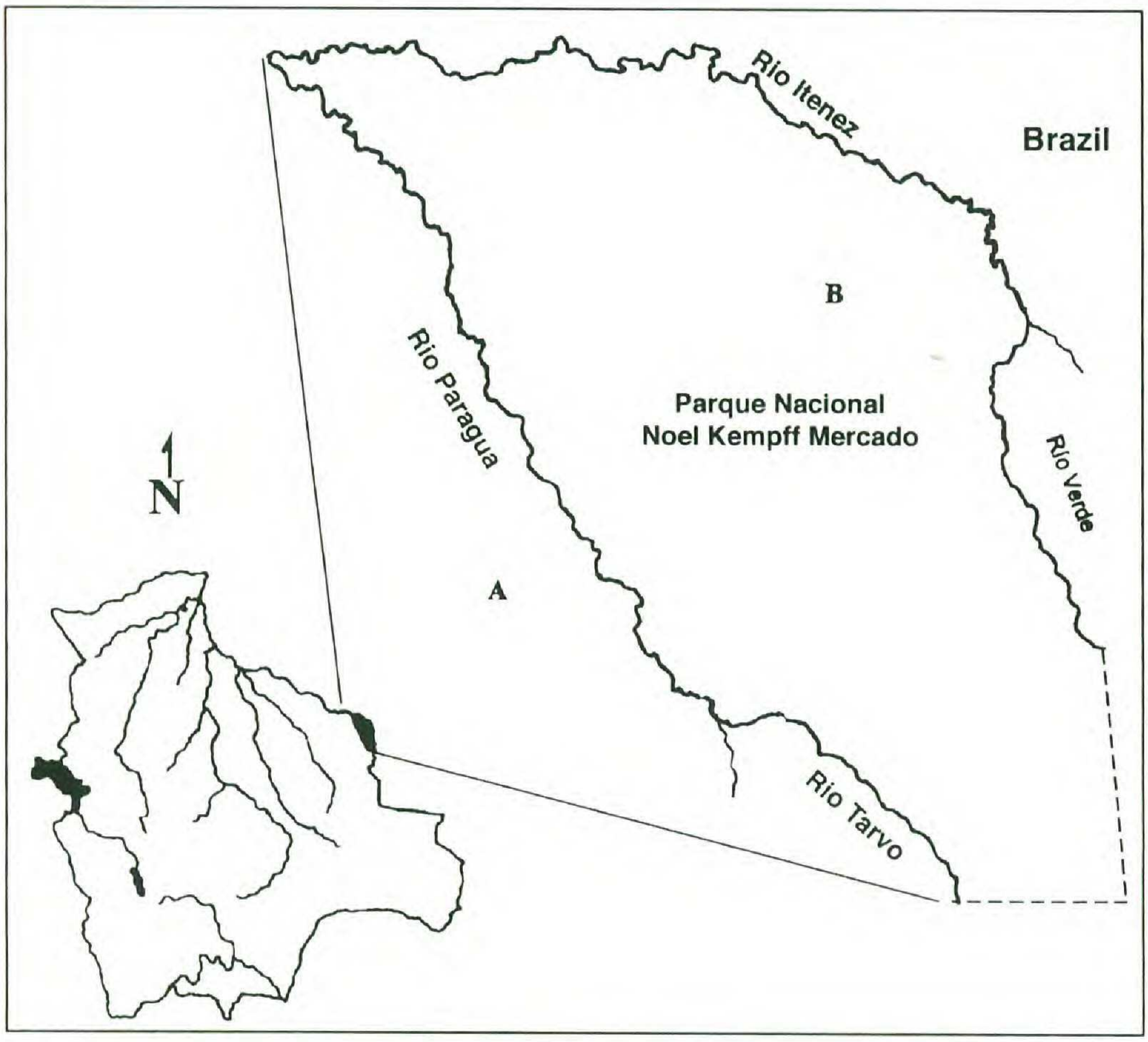


Figure 1. Parque Nacional Noel Kempff Mercado. **A**: Cerro Pelao. **B**: The stream on the Meseta. (Redrawn from Killeen and Schulenberg 1999)

Typical species in the seeps were *U. amethystina* Salzmann ex A. St.-Hil. & Girard and *U. pusilla* Vahl, and small, ephemeral, semi-aquatic herbs, such as *Polygala microspora* Blake (Polygalaceae) and *Burmannia flava* Mart. (Burmanniaceae).

Cerro Pelão (Figure 1) is a large inselberg located just outside the western border of the park (Killeen 1996), in the Reserva Forestal Bajo Paraguá. As with some areas of the Meseta, large expanses of exposed rock (lajas) are present. Where small seasonal streams and springs flow over these outcroppings, hydrophilic species in the genera *Utricularia* and *Rhynchospora,* and the family Eriocaulaceae can become established on the rocks and in the shallow sand and sediments that accumulate in pockets in the lajas. It was in this type of habitat that the third new record, *U. oliveriana,* was observed.

*Genlisea guianensis* is an erect herb with a rosette of elongate,

strap-shaped leaves and purple flowers. This species is considered to be relatively large for the genus (Taylor 1991), attaining heights up to about 30 cm (Brown 1900). Prior to its discovery in Bolivia, *G. guianensis* was thought to be limited to Venezuela, Guyana, and Brazil (Fromm-Trinta 1984; Taylor 1991).

Although superficially quite similar to *Utricularia, Genlisea* can be clearly differentiated on the basis of sepal number and trap morphology. The calyx is composed of five sepals, as compared to the typical 2 sepals in *Utricularia* (Cook 1990; Taylor 1991), while the traps are forked and possess two helically twisted branches, in contrast to the globose and bladder-like traps of *Utricularia* (Cook 1990; Reut 1993; Taylor 1991). Although the traps have long been thought to be involved in some form of carnivory, their function in trapping protozoa was only recently identified by Barthlott et al. (1998), who demonstrated that the traps lured protozoa through a chemical attractant.

The fruits of *Genlisea* are capsular, with the capsules of some species said to be unique among flowering plants in possessing an unusual circumscissile dehiscence that ruptures along three different planes (Taylor 1991). In describing this pattern of dehiscence, Taylor (1991) likened the capsule to a globe and depicted the planes of dehiscence as occurring not only at the equator, but also at two additional latitudes between the equator and one pole.

*Utricularia nana* is typically a diminutive herb, although the species is quite variable, ranging in height from 1.5 to 12.0 cm (Taylor 1989). All individuals we observed were extremely small (2.0–2.5 cm tall). We had never before encountered a *Utricularia* of such small stature, and it wasn't until we were able to ascertain that what at first appeared to be grains of sand trapped among the base of the plant were actually miniscule traps, that we became convinced that this was, indeed, a species of *Utricularia.* According to Taylor (1989), *U. nana* has a fairly wide distribution in South America, and was previously known from Venezuela, Guyana, Surinam, French Guiana, Brazil, and Paraguay.

*Utricularia oliveriana* is a small rheophytic, apparently perennial herb (Taylor 1989). This species is extremely similar to *U. neottioides* A. St.-Hil.—another rheophyte that is frequently encountered in streams and in water flowing over expanses of rock on the Meseta. These two species—which are the sole members of Section *Avisicaria* Kamiénski—are most easily distinguished

Table 1. Species of *Utricularia* known for Bolivia. Species names in parenthesis are as given by Foster (1958).

| Species | Foster (1958) | Taylor (1989) | Parque Noel Kempff M. |
|---|---|---|---|
| *U. alpina* Jacq. | + | + | |
| *U. amethystina* Salzmann ex A. St.-Hil. & Girard (*U. velascoënsis* O. Ktze.) | + | + | + |
| *U. breviscapa* Wright ex Grisebach | | + | + |
| *U. cornuta* Michx. (misidentified: almost certainly *U. meyeri* Pilg.) | + | | |
| *U. erectiflora* A. St.-Hil. & Girard | | + | |
| *U. foliosa* L. | | + | + |
| *U. gibba* L. (*U. obtusa* Sw.) | + | + | + |
| *U.* cf. *guyanensis* A. DC | | | + |
| *U. hispida* Lam. | | + | |
| *U. hydrocarpa* Vahl | | + | |
| *U. lloydii* Merl. | | + | |
| *U. meyeri* Pilg. | | + | + |
| *U. myriocista* A. St.-Hil. & Girard | | + | + |
| *U. nana* A. St.-Hil. | | | + |
| *U. neottioides* A. St.-Hil. (*U. Herzogii* Lützelberg) | + | + | + |
| *U. nervosa* G. Weber ex Benj. | | + | + |
| *U. oliveriana* Steyermark | | | + |
| *U. poconensis* Fromm-Trinta | | + | |
| *U. pusilla* Vahl | + | + | + |
| *U. simulans* Pilger | | + | + |

Table 1. Continued.

| Species | Foster (1958) | Taylor (1989) | Parque Noel Kempff M. |
|---|---|---|---|
| *U. subulata* L. | + | + | + |
| *U. tricophylla* Spruce ex Oliver (*U. globulariaefolia* Mart. ex Benj.) | | + | |
| *U. tricolor* A. St.-Hil. | + | + | + |
| *U. triloba* Benj. ex Mart. | | + | |
| *U. unifolia* Ruiz & Pavón | + | + | |
| *U. warmingii* Kamiénski | | + | |

on the basis of leaf shape, with *U. oliveriana* possessing tiny (2–8 mm total length) leaves with obovate simple laminae, while the leaves of *U. neottioides* are finely divided into pinnately arranged capillary segments and range in length from a few mm to several cm (Taylor 1989). The two species also differ in stature, with *U. oliveriana* characteristically possessing shorter inflorescences and thinner rhizoids than *U. neottioides*. Dimensions of the specimens from Cerro Pelao were slightly smaller than the lower limits listed for the species by Taylor (1989), with inflorescences from 12–17 mm in height (vs. 2 cm, Taylor), and leaves scarcely reaching 2 mm in length. *Utricularia oliveriana* was previously thought to be restricted to the Guyana Highland region, with populations known from Venezuela, Colombia, and Brazil (Taylor 1989).

To date, the most comprehensive floristic account of Bolivia is the checklist published over 40 years ago by Foster (1958). In his checklist, Foster listed nine species of *Utricularia* for Bolivia. In contrast, based on distributional information included by Taylor (1989) in his monograph of *Utricularia,* 22 of the 214 species that he recognized world-wide are known from Bolivia. With the additions of *U. nana* and *U. oliveriana,* 14 species of *Utricularia* are now known for Parque Noel Kempff Mercado, with a provisional fifteenth species awaiting confirmation (Table 1). According to Taylor (1989) 70 species occur within the entirety of South America, therefore, this one small corner of Bolivia contains one fifth of the continent's species of *Utricularia.* Based on Taylor's (1989) monograph, augmented by these new records, there are now 24 (possibly 25) species of *Utricularia* known for Bolivia (Table 1). Therefore, greater than half (58%) of the country's *Utricularia* species are now known to occur in Parque Nacional Noel Kempff Mercado. Furthermore, this level of diversity exceeds the number of species known for a number of other Neotropical countries, such as Panama (13 species; D'Arcy 1987), Peru (12 species; Brako and Zarucchi 1993), Ecuador (11 species; Jørgensen and León-Yánez 1999), and Costa Rica (10 species; Crow 1992).

## EXSICCATAE

*Genlisea guianensis* N. E. Brown. Parque Nacional Noel Kempff Mercado. "La Meseta"; east of Los Fierros. Elev. ca. 760 m. Semi-aquatic, emergent herb. Growing along the edges of the stream. Common. Corolla purple-blue.

Fruits present. The stream bottom varies from exposed bedrock to sand. Numerous small pools are present. Surrounding vegetation: Cerrado. 16 Aug 1996, *N. Ritter, G. Crow, M. Garvizu, M. Ritter & J. Crow 3614.* (MO, NHA, USZ).

*Utricularia nana* A. St.-Hil. & Girard. Parque Nacional Noel Kempff Mercado. "La Meseta"; east of Los Fierros. Elev. ca. 760 m. Diminutive herb. Growing in small seeps along the edges of the stream. Only a small number of individuals were noted. Corolla yellow; subtended by red sepals. The stream bottom varies from exposed bedrock to sand. Numerous small pools are present. Surrounding vegetation: Cerrado. 16 Aug. 1996, *N. Ritter, G. Crow, M. Garvizu, M. Ritter & J. Crow 3600.* (MO, NHA, USZ).

*Utricularia oliveriana* Steyermark. Santa Cruz, Provincia Velasco. Parque Nacional Noel Kempff Mercado. Cerro Pelão. Bosque Seco con *Talisia, Dilodendron, Amburana, Hymenaea, Anadenanthera, Chorisisa, Luehea, Metrodorea, Rhamnidium, Sebastiana, Spondias, Astronium, Aspidosperma* . . . Substrato con poco suelo sobre roca granítica. 14°32′23″ S 61°29′53″ W. 300m. Hierba; sobre roca húmeda, inclinada. 1 Apr 1994, *A. Jardim,* with *Saldias, Guillen, Ramos, Jensen, & Surubí 484* (MO, USZ).

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